

History of Pretty Prairie Public Water Supply **Pretty Prairie, Kansas**

Background Information:

Population: 600

Location: Reno county; about 46 miles west-northwest of Wichita, KS; and located west of the Cheney Reservoir.

Pretty Prairie Feasibility Study:

- **What does the December 7, 2007 feasibility study say?**
- The engineers reviewed the well that Pretty Prairie uses (Well No. 5), and acknowledged that 2 other drinking water wells had been closed for high nitrates.
- The engineers recommended that the city install a treatment plant the costs \$1.2M to achieve the nitrate MCL
- The engineers indicated that installing a treatment plant was not the most cost effective, but would provide Pretty Prairie with the best long-term nitrate treatment solutions.
- Based on the advantages and disadvantages of each treatment alternative reviewed, the engineers recommended that Pretty Prairie construct a central treatment plant and utilize the ion exchange process for nitrate treatment, discussed in Section 4.5 of the feasibility study (also presented in Table 6.1).

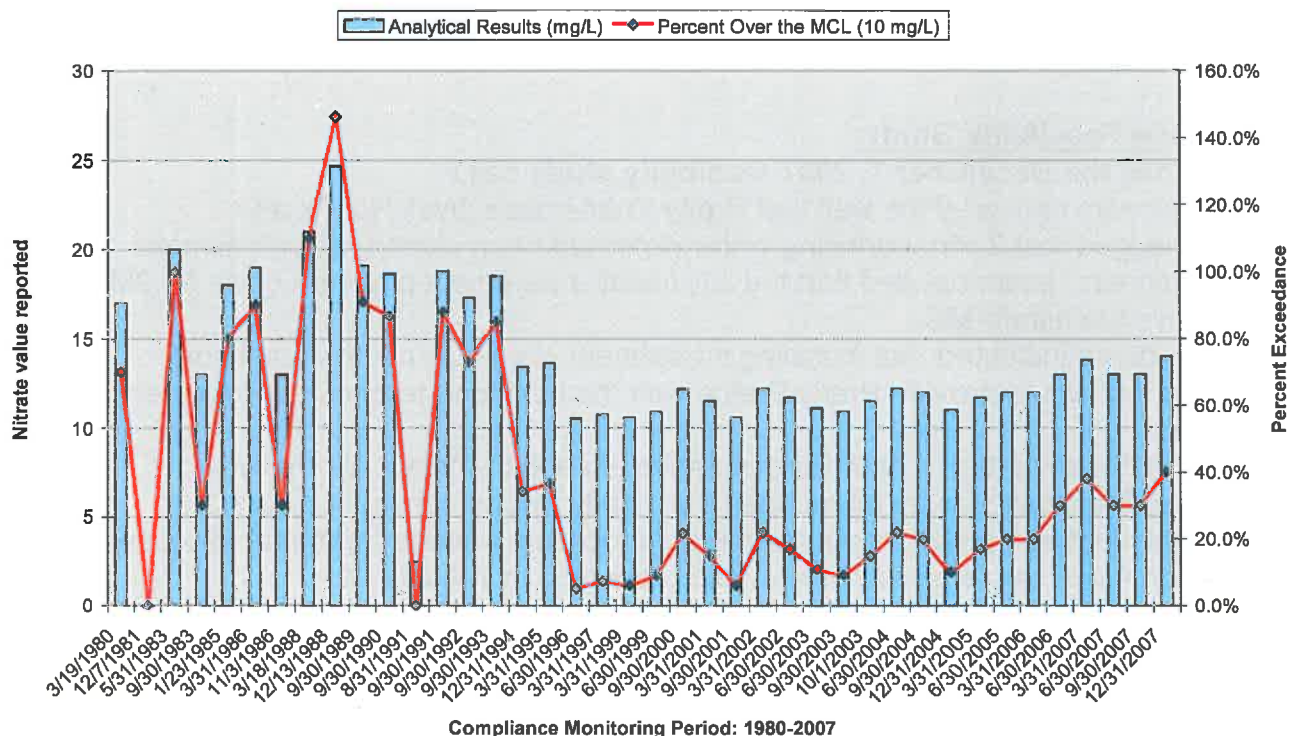
- **What are the options?**
- The options reviewed by the engineers, according to the KDHE Directive:
 - Obtaining a new source of raw water
 - Purchase water of acceptable quality from another PWS
 - Treatment options to reduce nitrate, including the feasibility of blending existing sources of water

- **What does the city need to move forward?**
- Pretty Prairie needs to coordinate a course of action with KDHE to meet the nitrate MCL.

- **What is KDHE doing?**
- Monitoring Pretty Prairie violations, and encouraging Pretty Prairie to take action based on the KDHE Directive issued in July 2007
- As of April 30, 2008, KDHE has not placed Pretty Prairie under any kind of schedule
- As of April 30, 2008, KDHE did not indicate when it would provide a compliance schedule with milestone date for Pretty Prairie to implement the feasibility study findings, such as bid contracts, award contracts, or commence construction of the recommended treatment system.

Chronology of Actions and Violations:

Summary of Nitrate MCL Violations in Pretty Prairie Public Water System Pretty Prairie, KS



- **1979 - 1993** – SDWIS data indicates nitrate levels varying between 13 – 25 mg/L.
- **1994** – Pretty Prairie constructed new well. Brief return to compliance with nitrate MCL.
- **1996 - 2008** – SDWIS data indicates that Pretty Prairie continued to have nitrate MCL exceedances. Levels range from 11 to 14 mg/L.

February 1989 - KDHE issued Administrative Order 89-E-10 on 2/13/1989 with a compliance schedule including actions to be taken to meet nitrate MCL.

- Pretty Prairie did not appeal this KDHE Order, so the Order became final.

October 1990 – KDHE issued Administrative Order 90-E-71 on 10/28/1990 for failure to comply with AO 89-E-10 & pay \$12,675 in penalties.

- Pretty Prairie appealed this KDHE Order before it became final.
- KDHE AO 89-E-10 was incorporated by reference.
- This Order did not become effective, so KDHE and Pretty Prairie entered into enforcement negotiations.

October 1991 – KDHE and Pretty Prairie entered into Consent Order 91-E-71 on 10/24/1991 for violations.

- Pretty Prairie agreed to comply with nitrate MCL by following compliance schedule & paying \$675 in civil penalties.

- KDHE dismissed the remaining penalty on the condition that Pretty Prairie had to comply with a compliance schedule to RTC with the nitrate MCL.

January 1994 – EPA issued an Administrative Compliance Order to Pretty Prairie on January 3, 1994 for violations of the nitrate MCL.

- ACO required Pretty Prairie to take certain scheduled steps to bring its PWS into compliance with the nitrate MCL of 10 mg/L.
 - Advertising for construction bids of necessary improvements to the system,
 - Awarding a contract for construction of improvements, and
 - Completing construction for necessary improvements to the PWS.
- Pretty Prairie only completed the requirement to advertise for construction bids.

February 1994 – Pretty Prairie filed a Petition for Review by the Court on February 17, 1994, because EPA and KDHE denied Pretty Prairie's request for an exemption from the nitrate MCL.

February 1994 – Pretty Prairie filed a Petition for Review by a different Court on February 17, 1994, challenging the issuance of EPA's ACO.

March 1994 – Pretty Prairie and EPA held conference calls about Pretty Prairie's strategy to RTC with the nitrate MCL.

- At the end of March 1994, Pretty Prairie provided EPA additional details of its proposal to develop a new source well with concentrations below nitrate MCL. EPA
- EPA agreed to amend the ACO to extend the deadline for awarding the construction contract until April 11, 1994.

April 1994 – EPA and Pretty Prairie met and agreed to take a number of actions from April to June 1994.

- EPA agreed to extend the deadline for Pretty Prairie to award the construction contract for PWS improvements until June 10, 1994.
- Pretty Prairie agreed to provide EPA with additional information about the cost of building a new treatment facility for the PWS
- Pretty Prairie stated its intention to drill a new test well
- Pretty Prairie agreed to analyze the quality of the water and report its findings to EPA by May 25, 1994.
- Meeting scheduled for June 1, 1994 to discuss Pretty Prairie's options for complying with the SDWA.
- EPA began to amend the January 1994 ACO, based on these commitments.

June 1, 1994 – EPA and Pretty Prairie held a conference call.

- Pretty Prairie submitted information about its plan to drill a new well.
- EPA advised Pretty Prairie that the likelihood of drilling a new water supply well which could produce water under the nitrate MCL for reasonable period of time appeared low.
- Pretty Prairie identified three possible routes for bringing its PWS back into compliance with the nitrate MCL.

- 1. Drill a new water supply well which can produce water with a nitrate level at or below the 10 mg/L MCL.
- 2. Install an ion exchange water treatment system, based on sodium chloride technology. This approach presented a waste disposal problem of the sodium chloride, but Pretty Prairie had identified a disposal well that can accept the wastes in accordance with the SDWA.
- 3. Install an ion exchange water treatment system based on potassium chloride technology. Relatively new treatment technology, the approach had an advantage because the waste solids could be disposed of in the sewers.
- Pretty Prairie preferred to drill a new well, and had concluded a series of activities to enable the city to determine the viability of that approach.
- Pretty Prairie expected to have sufficient data by August 8, 1994 to commit to implementation of 1 of the 3 approaches discussed above.

June 1994 – EPA issued an Amended Administrative Compliance Order on Consent Docket VII-93-PWS-04 on June 27, 1994 that required Pretty Prairie to achieve compliance with the nitrate MCL.

- Pretty Prairie Mayor had to notify EPA by August 8, 1994 what approach the city would take to RTC with the nitrate MCL.
- Pretty Prairie had to achieve compliance with the nitrate MCL by the following dates using the following treatment technologies:
 - November 1, 1994 – if Pretty Prairie drilled a new city water supply well
 - March 1, 1995 – if Pretty Prairie installed a conventional sodium chloride ion exchange water treatment system
 - March 1, 1995 – if Pretty Prairie installed a continuous ion exchange system (potassium chloride) water treatment system
- Pretty Prairie had to continually implement bottled water and public notification programs UNLESS
 - Certified to EPA that sampling November 1994 – January 1995 showed that the nitrate level was consistently below nitrate MCL, OR
 - Certified to EPA that the selected ion exchange treatment system was in operation, and sampling confirmed that the nitrate level was consistently below nitrate MCL

November 1994 - June 1995 – Pretty Prairie chose to drill a new well to comply with the nitrate MCL.

- Well No. 5 was constructed and placed into operation for the Pretty Prairie system.
- Pretty Prairie removed Wells No. 3 and 4 from service, and relied entirely on Well No. 5.

June 1995 – Pretty Prairie's new well achieved compliance with the terms of the EPA Amended ACO.

- Pretty Prairie achieved compliance with the nitrate MCL for a short time.

Early to mid-1996 – EPA closed the Consent Order, once Pretty Prairie demonstrated compliance with the nitrate MCL for a three month period.

- After the Consent Order was closed, Pretty Prairie's new well (Well No. 5) did not maintain compliance with the nitrate MCL, as EPA had suspected and advised in June 1994.

August 1996 – KDHE issued Consent Order 96-E-0263 to Pretty Prairie.

- Pretty Prairie expressed interest in proceeding with a wellhead protection plan
- Pretty Prairie did not appeal this KDHE Order, so the Order became final.

August 1996 – A KDHE letter to Pretty Prairie indicated that EPA agreed to close its ACO with Pretty Prairie after the KDHE Consent Order is executed.

October 15, 1996 - KDHE Consent Order 96-E-0263 for Pretty Prairie became effective and required the following steps towards compliance:

- The Consent Order commits the city to participate in the Kansas Wellhead Protection Program, and
- The Consent Order contains elements of the Kansas Nitrate Compliance Strategy.
- The Order was designed to expire in 7 years, per the then-draft Kansas Nitrate Strategy

March 1997- KDHE/EPA execute the Kansas Nitrate Strategy

- Intent was to establish a response procedure to address PWSs with recurring nitrate MCL violations in Kansas.
- Implemented through Admin. Orders to expire 7 years from issuance.
- Options to achieve compliance with the nitrate MCL of 10 mg/L included:
 - Blending
 - New Source
 - Purchase from another PWS
 - Ion exchange
 - Reverse osmosis

April 2005 – EPA R7 reviewed PWS files at KDHE for FY03 Annual Program Evaluation (APE) during April 20-21, 2005.

- Pretty Prairie files indicated that the PWS was out of compliance with the 24 hour public notification requirement in 40 CFR 141.202

February 2007 – KDHE issued a letter to EPA about Nitrate Strategy.

- KDHE still had Orders in place, and will honor Orders until they expire.
- KDHE identified strategy to resolved systems out of compliance with nitrate MCL
- KDHE agreed to commit to review 2005 and 2006 nitrate results from 6 systems (including Pretty Prairie) for nitrate violations occurring in 2 out of any 3 consecutive quarters.
- KDHE agreed to issue a directive to require systems in violation with nitrate MCL to hire a consulting engineer to prepare an engineering report and cost estimates to RTC with nitrate MCL.
- KDHE agreed to review the engineers' cost estimates with each water system and negotiate a schedule to complete the best option.

July 20, 2007 – KDHE issued a Directive to Pretty Prairie. The Directive outlined the following requirements:

- Sample water for nitrate once every 3 months (quarterly)
- If the test results indicate nitrate MCL exceedance at the point of entry, then Pretty Prairie had to do the following:
 - Issue public notice to all customers within 24 hours
 - Provide an alternate source of drinking water free of charge to infants, nursing mothers, and pregnant women
 - If Pretty Prairie chose to use bottled water to meet this requirement, then Pretty Prairie had to obtain certification from the bottled water supplier that the bottled water meets the appropriate US FDA requirements [there are no time restrictions for this choice, contradicting the SDWA]
- Pretty Prairie had to obtain the services of an engineer to prepare a formal feasibility study, including cost estimates to comply with the nitrate MCL
- Pretty Prairie had to submit the Feasibility Study to KDHE by December 20, 2007
- Pretty Prairie and KDHE were to jointly review the results of the study and determine a course of action.
- At a minimum, the feasibility study had to address the following options:
 - Obtaining a new source of raw water
 - Purchase water of acceptable quality from another PWS
 - Treatment options to reduce nitrate, including the feasibility of blending existing sources of water
 - If new source water can be obtained, minimizing the use of, or removing from service, the individual water well causing the violations

December 7, 2007 – KDHE received the feasibility study results from Pretty Prairie

December 2007 – Pretty Prairie met with KDHE to discuss the feasibility study findings and recommendations.

- KDHE and Pretty Prairie discussed that feasibility study identified treatment options to comply with the nitrate MCL.
- The feasibility study indicated that a \$1.2M treatment plant was the least expensive and most feasible option for compliance with the nitrate MCL.

January - February 2008 – Pretty Prairie was in the Unaddressed SNC List for 1QtrFY08 (Oct.-Dec. 2007), which is generated from SDWIS.

- KDHE indicated in its response to EPA that Pretty Prairie's feasibility study identified the \$1.2M treatment plant as the most feasible option for compliance with the nitrate MCL.

January 11, 2008 – Pretty Prairie article in local newspaper

- Pretty Prairie spent \$7,500 for a nitrate feasibility study

- 2007 feasibility study provided options starting at \$1.2M
- Pretty Prairie Council discussed the nitrate issue and the feasibility study findings at their regular council meeting on Monday, January 7th.
- Pretty Prairie requested justification from KDHE and EPA for the change in the nitrate policy of allowing bottled water after the feasibility study confirmed that a study completed in the mid-1990s indicated that solving the problem with a convention approach would cost the city
- The recommended solution for the study conducted in the mid-1990s was for the city to install a costly ion exchange treatment system. The city would have needed to containerize, and to obtain a solid waste permit from KDHE to get rid of the sodium chloride generated by the ion exchange treatment.
- The city chose not to follow this option in the mid-1990s, partly because KDHE couldn't write a solid waste permit for this situation in advance.

February 4, 2008 – EPA sent a letter to Pretty Prairie clarifying that Pretty Prairie could not use bottled water indefinitely.

- EPA's letter clearly stated that according to the SDWA, bottled water was only for use on a temporary basis, and not as a means of treatment to comply with the nitrate MCL.

February 22, 2008 – Pretty Prairie article in local newspaper

- Mayor was concerned that EPA's February 2008 letter didn't provide a clear explanation of steps to take, since Pretty Prairie could no longer use bottled water as a substitution for treatment.
- Estimated cost of installing a water treatment system will be \$1.2M.
- Pretty Prairie town residents may have their water rates boosted by at \$16 per month to afford treatment.

April 16, 2008 – Pretty Prairie sent EPA a letter inviting the Agency to meet and discuss nitrate issues.

- It appears that Pretty Prairie wants to discuss its practice of using bottled water, and why the Kansas Nitrate Strategy is no longer in effect.
- Pretty Prairie has met with EPA in the past to discuss nitrate MCL violations, and was able to discuss extensions for compliance schedules

May 16, 2008 – EPA drafted a letter to send to Pretty Prairie, encouraging Pretty Prairie to cooperate with KDHE and to implement the findings of the feasibility study as the means to achieve compliance with the nitrate MCL.

May 19, 2008 – Pretty Prairie's current status with KDHE:

- Pretty Prairie is not currently in the 2QtrFY08 (Jan.-March 2008) Unaddressed SNC List

FYI:

March 3, 2008 – USGS report for *Vulnerability of Recently Recharged Ground Water in the High Plains Aquifer to Nitrate Contamination*:

- Relative background concentration discussed, starting on page 22
- Parts of Reno County, including Pretty Prairie and the Cheney Reservoir, are identified in several maps indicating contamination occurring in non-irrigated agricultural land originating from non-point sources
- Hydrologists' model maps indicate that Pretty Prairie has a 41-80% probability of background nitrate concentrations greater than 4 mg/L for a regional water table depth of 0-30.5 meters

Physical / geological: Reno County has the following characteristics, which surrounds Pretty Prairie, and may influence some of PWS wells:

- Arkansas River Lowlands to the north and west – sand and gravel deposits, irregular hills, and sand dunes
- Wellington and McPherson Lowlands to the southwest and northeast – permeable sand and gravel, and a large quantity of high-quality water in the Equus beds nearby
- Osage Questas underlying Pretty Prairie – hill-plain or broad-terraces, steep eastern slopes, with plentiful limestone supply